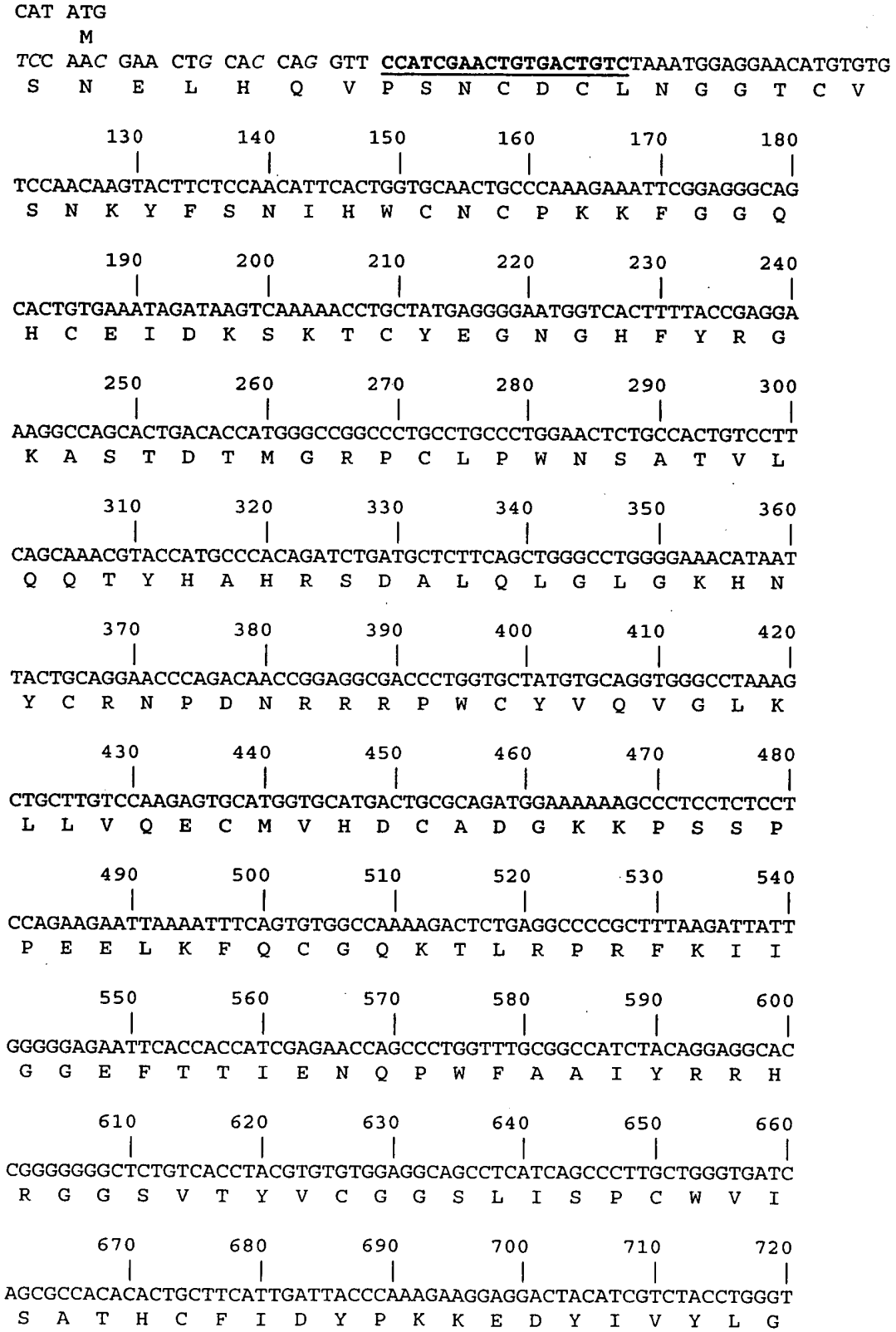
Fig. 1a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M
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S N E L H Q V P S N C D C L N G G T C V
130 140 150 160 170 180
TCCAACAAGTACTTCTCCAACATTCACTGGTGCAACTGCCCAAAGAAATTCGGAGGGCAG
S N K Y F S N I H W C N C P K K F G G Q
190 200 210 220 230 240
CACTGTGAAATAGATAAGTCAAAAACCTGCTATGAGGGGAATGGTCACTTTTACCGAGGA
H C E I D K S K T C Y E G N G H F Y R G
250 260 270 280 290 300
AAGGCCAGCACTGACACCATGGGCCGGCCCTGCCTGCCCTGGAACTCTGCCACTGTCCTT
K A S T D T M G R P C L P W N S A T V L
310 320 330 340 350 360
CAGCAAACGTACCATGCCCACAGATCTGATGCTCTTCAGCTGGGCCTGGGGAAACATAAT
Q Q T Y H A H R S D A L Q L G L G K H N
370 380 390 400 410 420
TACTGCAGGAACCCAGACAACCGGAGGCGACCCTGGTGCTATGTGCAGGTGGGCCTAAAG
Y C R N P D N R R R P W C Y V Q V G L K
430 440 450 460 470 480
CTGCTTGTCCAAGAGTGCATGGTGCATGACTGCGCAGATGGAAAAAAGCCCTCCTCTCCT
L L V Q E C M V H D C A D G K K P S S P
490 500 510 520 530 540
CCAGAAGAATTAAAATTTCAGTGTGGCCAAAAGACTCTGAGGCCCCGCTTTAAGATTATT
P E E L K F Q C G Q K T L R P R F K I I
550 560 570 580 590 600
GGGGGAGAATTCACCACCATCGAGAACCAGCCCTGGTTTGCGGCCATCTACAGGAGGCAC
G G E F T T I E N Q P W F A A I Y R R H
610 620 630 640 650 660
CGGGGGGGCTCTGTCACCTACGTGTGTGGAGGCAGCCTCATCAGCCCTTGCTGGGTGATC
R G G S V T Y V C G G S L I S P C W V I
670 680 690 700 710 720
AGCGCCACACACTGCTTCATTGATTACCCAAAGAAGGAGGACTACATCGTCTACCTGGGT
S A T H C F I D Y P K K E D Y I V Y L G

Fig. 1b

```
        730         740         750         760         770         780
         |           |           |           |           |           |
CGCTCAAGGCTTAACTCCAACACGCAAGGGGAGATGAAGTTTGAGGTGGAAAACCTCATC
 R  S  R  L  N  S  N  T  Q  G  E  M  K  F  E  V  E  N  L  I

        790         800         810         820         830         840
         |           |           |           |           |           |
CTACACAAGGACTACAGCGCTGACACGCTTGCTCACCACAACGACATTGCCTTGCTGAAG
 L  H  K  D  Y  S  A  D  T  L  A  H  H  N  D  I  A  L  L  K

        850         860         870         880         890         900
         |           |           |           |           |           |
ATCCGTTCCAAGGAGGGCAGGTGTGCGCAGCCATCCCGGACTATACAGACCATCTGCCTG
 I  R  S  K  E  G  R  C  A  Q  P  S  R  T  I  Q  T  I  C  L

        910         920         930         940         950         960
         |           |           |           |           |           |
CCCTCGATGTATAACGATCCCCAGTTTGGCACAAGCTGTGAGATCACTGGCTTTGGAAAA
 P  S  M  Y  N  D  P  Q  F  G  T  S  C  E  I  T  G  F  G  K

        970         980         990        1000        1010        1020
         |           |           |           |           |           |
GAGAATTCTACCGACTATCTCTATCCGGAGCAGCTGAAAATGACTGTTGTGAAGCTGATT
 E  N  S  T  D  Y  L  Y  P  E  Q  L  K  M  T  V  V  K  L  I

        1030        1040        1050        1060        1070        1080
         |           |           |           |           |           |
TCCCACCGGGAGTGTCAGCAGCCCCACTACTACGGCTCTGAAGTCACCACCAAAATGCTG
 S  H  R  E  C  Q  Q  P  H  Y  Y  G  S  E  V  T  T  K  M  L

        1090        1100        1110        1120        1130        1140
         |           |           |           |           |           |
TGTGCTGCTGACCCACAGTGGAAAACAGATTCCTGCCAGGGAGACTCAGGGGGACCCCTC
 C  A  A  D  P  Q  W  K  T  D  S  C  Q  G  D  S  G  G  P  L

        1150        1160        1170        1180        1190        1200
         |           |           |           |           |           |
GTCTGTTCCCTCCAAGGCCGCATGACTTTGACTGGAATTGTGAGCTGGGGCCGTGGATGT
 V  C  S  L  Q  G  R  M  T  L  T  G  I  V  S  W  G  R  G  C

        1210        1220        1230        1240        1250        1260
         |           |           |           |           |           |
GCCCTGAAGGACAAGCCAGGCGTCTACACGAGAGTCTCACACTTCTTACCCTGGATCCGC
 A  L  K  D  K  P  G  V  Y  T  R  V  S  H  F  L  P  W  I  R

        1270        1280        1290        1300        1310        1320
         |           |           |           |           |           |
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 S  H  T  K  E  E  N  G  L  A  L  *
```

Fig. 2

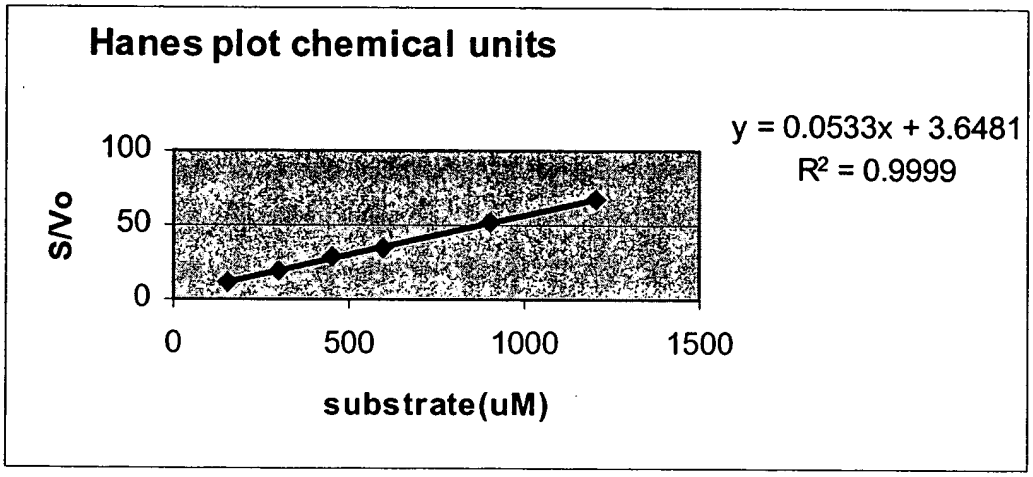
Hanes plot chemical units
y = 0.0533x + 3.6481
R² = 0.9999
S/Vo
100
50
0
0
500
1000
1500
substrate(uM)

Fig. 3

```
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 M  S  N  E  L  H  Q  V  P  S  N  C  D  C  L  N  G  G  T
tgtgtgagcaacaaatacttcagcaacattcactggtgcaactgcccgaaaaaattcggt
 C  V  S  N  K  Y  F  S  N  I  H  W  C  N  C  P  K  K  F  G
ggccagcactgtgaaatcgataaaagcaaaacctgctatgaaggcaatggtcacttttac
 G  Q  H  C  E  I  D  K  S  K  T  C  Y  E  G  N  G  H  F  Y
cgcggcaaagccagcaccgataccatgggccgtccgtgcctgccgtggaacagcgccacc
 R  G  K  A  S  T  D  T  M  G  R  P  C  L  P  W  N  S  A  T
gttctgcagcagacctaccatgcccaccgtagcgatgcgctgcagctgggcctgggtaaa
 V  L  Q  Q  T  Y  H  A  H  R  S  D  A  L  Q  L  G  L  G  K
cataattactgccgcaacccggataaccgtcgtcgtccgtggtgctatgtgcaggtgggc
 H  N  Y  C  R  N  P  D  N  R  R  R  P  W  C  Y  V  Q  V  G
ctgaaaccgctggttcaggaatgcatggtgcatgattgcgcggatggtaaaaaaccgagc
 L  K  P  L  V  Q  E  C  M  V  H  D  C  A  D  G  K  K  P  S
agcccgccggaagaactgaaattccagtgtggccagaaaaccctgcgtccgcgctttaaa
 S  P  P  E  E  L  K  F  Q  C  G  Q  K  T  L  R  P  R  F  K
attattggcggcgaattcaccaccatcgaaaaccagccgtggtttgcggccatctaccgt
 I  I  G  G  E  F  T  T  I  E  N  Q  P  W  F  A  A  I  Y  R
cgtcaccgtggtggcagcgttacctacgtgtgtggtggcagcctgatcagcccgtgctgg
 R  H  R  G  G  S  V  T  Y  V  C  G  G  S  L  I  S  P  C  W
gtgatcagcgccacccactgcttcattgattacccgaaaaaagaagattacatcgtttac
 V  I  S  A  T  H  C  F  I  D  Y  P  K  K  E  D  Y  I  V  Y
ctgggtcgcagccgtctgaacagcaacacccagggcgaaatgaaatttgaagtggaaaac
 L  G  R  S  R  L  N  S  N  T  Q  G  E  M  K  F  E  V  E  N
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 L  I  L  H  K  D  Y  S  A  D  T  L  A  H  H  N  D  I  A  L
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 I  R  S  H  T  K  E  E  N  G  L  A  L  -
```